RETURN TO MAIN MENU

IM865

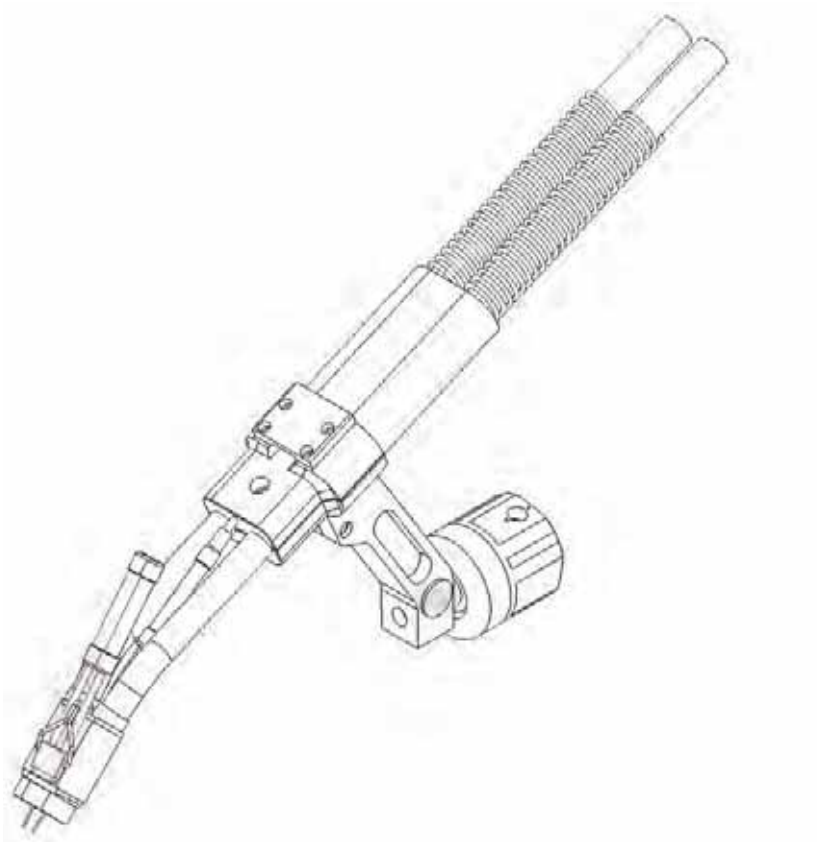
TANDEM MIG 800 AMPERAGE WELDING TORCH

February, 2005

Models: **S22693-121, -122, -123, -124, -133**

Safety Depends on You

Lincoln arc welding and cutting equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation ... and thoughtful operation on your part. **DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT.** And, most importantly, think before you act and be careful.



OPERATOR'S MANUAL

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LINCOLN® ELECTRIC

• World's Leader in Welding and Cutting Products •
• Sales and Service through Subsidiaries and Distributors Worldwide •
Cleveland, Ohio 44117-1199 U.S.A. TEL: 216.481.8100 FAX: 216.486.1751 WEB SITE: www.lincolnelectric.com

⚠ WARNING

CALIFORNIA PROPOSITION 65 WARNINGS ⚠

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

The Above For Diesel Engines

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

The Above For Gasoline Engines

ARC WELDING CAN BE HAZARDOUS. PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS SHOULD CONSULT WITH THEIR DOCTOR BEFORE OPERATING.

Read and understand the following safety highlights. For additional safety information, it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting - ANSI Standard Z49.1" from the American Welding Society, P.O. Box 351040, Miami, Florida 33135 or CSA Standard W117.2-1974. A Free copy of "Arc Welding Safety" booklet E205 is available from the Lincoln Electric Company, 22801 St. Clair Avenue, Cleveland, Ohio 44117-1199.

BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.

FOR ENGINE powered equipment.

1.a. Turn the engine off before troubleshooting and maintenance work unless the maintenance work requires it to be running.

1.b. Operate engines in open, well-ventilated areas or vent the engine exhaust fumes outdoors.

1.c. Do not add the fuel near an open flame welding arc or when the engine is running. Stop the engine and allow it to cool before refueling to prevent spilled fuel from vaporizing on contact with hot engine parts and igniting. Do not spill fuel when filling tank. If fuel is spilled, wipe it up and do not start engine until fumes have been eliminated.

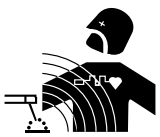
1.d. Keep all equipment safety guards, covers and devices in position and in good repair.Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.

1.e. In some cases it may be necessary to remove safety guards to perform required maintenance. Remove guards only when necessary and replace them when the maintenance requiring their removal is complete. Always use the greatest care when working near moving parts.

1.f. Do not put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.

1.g. To prevent accidentally starting gasoline engines while turning the engine or welding generator during maintenance work, disconnect the spark plug wires, distributor cap or magneto wire as appropriate.

1.h. To avoid scalding, do not remove the radiator pressure cap when the engine is hot.



ELECTRIC AND MAGNETIC FIELDS may be dangerous

2.a. Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding current creates EMF fields around welding cables and welding machines

2.b. EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.

2.c. Exposure to EMF fields in welding may have other health effects which are now not known.

2.d. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

2.d.1. Route the electrode and work cables together - Secure them with tape when possible.

2.d.2. Never coil the electrode lead around your body.

2.d.3. Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.

2.d.4. Connect the work cable to the workpiece as close as possible to the area being welded.

2.d.5. Do not work next to welding power source.

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ELECTRIC SHOCK can kill.

3.a. The electrode and work (or ground) circuits are electrically "hot" when the welder is on. Do not touch these "hot" parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.

3.b. Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:

- **Semiautomatic DC Constant Voltage (Wire) Welder.**
- **DC Manual (Stick) Welder.**
- **AC Welder with Reduced Voltage Control.**

3.c. In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically "hot".

3.d. Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.

3.e. Ground the work or metal to be welded to a good electrical (earth) ground.

3.f. Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.

3.g. Never dip the electrode in water for cooling.

3.h. Never simultaneously touch electrically "hot" parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.

3.i. When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.

3.j. Also see Items 6.c. and 8.

ARC RAYS can burn.

4.a. Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87. I standards.

4.b. Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.

4.c. Protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.

FUMES AND GASES can be dangerous.

5.a. Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases.When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone. **When welding with electrodes which require special ventilation such as stainless or hard facing (see instructions on container or MSDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and below Threshold Limit Values (TLV) using local exhaust or mechanical ventilation. In confined spaces or in some circumstances, outdoors, a respirator may be required. Additional precautions are also required when welding on galvanized steel.**

5.b. Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.

5.c. Shielding gases used for arc welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.

5.d. Read and understand the manufacturer's instructions for this equipment and the consumables to be used, including the material safety data sheet (MSDS) and follow your employer's safety practices. MSDS forms are available from your welding distributor or from the manufacturer.

5.e. Also see item 1.b.

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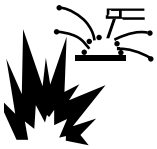


WELDING SPARKS can cause fire or explosion.

6.a. Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.

6.b. Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to “Safety in Welding and Cutting” (ANSI Standard Z49.1) and the operating information for the equipment being used.

6.c. When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.

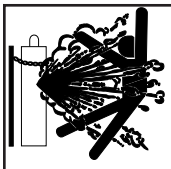
6.d. Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to insure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been “cleaned”. For information, purchase “Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances”, AWS F4.1 from the American Welding Society (see address above).

6.e. Vent hollow castings or containers before heating, cutting or welding. They may explode.

6.f. Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.

6.g. Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.

6.h. Also see item 1.c.



CYLINDER may explode if damaged.

7.a. Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.

7.b. Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.

7.c. Cylinders should be located:

- Away from areas where they may be struck or subjected to physical damage.
- A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.

7.d. Never allow the electrode, electrode holder or any other electrically “hot” parts to touch a cylinder.

7.e. Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.

7.f. Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.

7.g. Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-l, “Precautions for Safe Handling of Compressed Gases in Cylinders,” available from the Compressed Gas Association 1235 Jefferson Davis Highway, Arlington, VA 22202.

FOR ELECTRICALLY powered equipment.

8.a. Turn off input power using the disconnect switch at the fuse box before working on the equipment.

8.b. Install equipment in accordance with the U.S. National Electrical Code, all local codes and the manufacturer’s recommendations.

8.c. Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer’s recommendations.

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PRÉCAUTIONS DE SÛRETÉ

Pour votre propre protection lire et observer toutes les instructions et les précautions de sûreté specifiques qui parraissent dans ce manuel aussi bien que les précautions de sûreté générales suivantes:

Sûreté Pour Soudage A L'Arc

1. Protegez-vous contre la secousse électrique:

   a. Les circuits à l'électrode et à la piéce sont sous tension quand la machine à souder est en marche. Eviter toujours tout contact entre les parties sous tension et la peau nue ou les vétements mouillés. Porter des gants secs et sans trous pour isoler les mains.
   b. Faire trés attention de bien s'isoler de la masse quand on soude dans des endroits humides, ou sur un plancher metallique ou des grilles metalliques, principalement dans les positions assis ou couché pour lesquelles une grande partie du corps peut être en contact avec la masse.
   c. Maintenir le porte-électrode, la pince de masse, le câble de soudage et la machine à souder en bon et sûr état defonctionnement.
   d. Ne jamais plonger le porte-électrode dans l'eau pour le refroidir.
   e. Ne jamais toucher simultanément les parties sous tension des porte-électrodes connectés à deux machines à souder parce que la tension entre les deux pinces peut être le total de la tension à vide des deux machines.
   f. Si on utilise la machine à souder comme une source de courant pour soudage semi-automatique, ces precautions pour le porte-électrode s'applicuent aussi au pistolet de soudage.

2. Dans le cas de travail au dessus du niveau du sol, se protéger contre les chutes dans le cas ou on recoit un choc. Ne jamais enrouler le câble-électrode autour de n'importe quelle partie du corps.

3. Un coup d'arc peut être plus sévère qu'un coup de soliel, donc:

   a. Utiliser un bon masque avec un verre filtrant approprié ainsi qu'un verre blanc afin de se protéger les yeux du rayonnement de l'arc et des projections quand on soude ou quand on regarde l'arc.
   b. Porter des vêtements convenables afin de protéger la peau de soudeur et des aides contre le rayonnement de l'arc.
   c. Protéger l'autre personnel travaillant à proximité au soudage à l'aide d'écrans appropriés et non-inflammables.

4. Des gouttes de laitier en fusion sont émises de l'arc de soudage. Se protéger avec des vêtements de protection libres de l'huile, tels que les gants en cuir, chemise épaisse, pantalons sans revers, et chaussures montantes.

5. Toujours porter des lunettes de sécurité dans la zone de soudage. Utiliser des lunettes avec écrans lateraux dans les zones où l'on pique le laitier.

6. Eloigner les matériaux inflammables ou les recouvrir afin de prévenir tout risque d'incendie dû aux étincelles.

7. Quand on ne soude pas, poser la pince à une endroit isolé de la masse. Un court-circuit accidental peut provoquer un échauffement et un risque d'incendie.

8. S'assurer que la masse est connectée le plus prés possible de la zone de travail qu'il est pratique de le faire. Si on place la masse sur la charpente de la construction ou d'autres endroits éloignés de la zone de travail, on augmente le risque de voir passer le courant de soudage par les chaines de levage, câbles de grue, ou autres circuits. Cela peut provoquer des risques d'incendie ou d'echauffement des chaines et des câbles jusqu'à ce qu'ils se rompent.

9. Assurer une ventilation suffisante dans la zone de soudage. Ceci est particuliérement important pour le soudage de tôles galvanisées plombées, ou cadmiées ou tout autre métal qui produit des fumeés toxiques.

10. Ne pas souder en présence de vapeurs de chlore provenant d'opérations de dégraissage, nettoyage ou pistolage. La chaleur ou les rayons de l'arc peuvent réagir avec les vapeurs du solvant pour produire du phosgéne (gas fortement toxique) ou autres produits irritants.

11. Pour obtenir de plus amples renseignements sur la sûreté, voir le code "Code for safety in welding and cutting" CSA Standard W 117.2-1974.

PRÉCAUTIONS DE SÛRETÉ POUR LES MACHINES À SOUDER À TRANSFORMATEUR ET À REDRESSEUR

1. Relier à la terre le chassis du poste conformement au code de l'électricité et aux recommendations du fabricant. Le dispositif de montage ou la piece à souder doit être branché à une bonne mise à la terre.

2. Autant que possible, l'installation et l'entretien du poste seront effectués par un électricien qualifié.

3. Avant de faires des travaux à l'interieur de poste, la debrancher à l'interrupteur à la boite de fusibles.

4. Garder tous les couvercles et dispositifs de sûreté à leur place.

Thank You for selecting a **QUALITY** product by Lincoln Electric. We want you to take pride in operating this Lincoln Electric Company product ••• as much pride as we have in bringing this product to you!

Please Examine Carton and Equipment For Damage Immediately

When this equipment is shipped, title passes to the purchaser upon receipt by the carrier. Consequently, Claims for material damaged in shipment must be made by the purchaser against the transportation company at the time the shipment is received.

Please record your equipment identification information below for future reference. This information can be found on your machine nameplate.

Product _____

Model Number _____

Code Number or Date Code_____

Serial Number_____

Date Purchased_____

Where Purchased_____

Whenever you request replacement parts or information on this equipment, always supply the information you have recorded above. The code number is especially important when identifying the correct replacement parts.

On-Line Product Registration

- Register your machine with Lincoln Electric either via fax or over the Internet.

• For faxing: Complete the form on the back of the warranty statement included in the literature packet accompanying this machine and fax the form per the instructions printed on it.

• For On-Line Registration: Go to our **WEB SITE at www.lincolnelectric.com.** Choose "Quick Links" and then "Product Registration". Please complete the form and submit your registration.

Read this Operators Manual completely before attempting to use this equipment. Save this manual and keep it handy for quick reference. Pay particular attention to the safety instructions we have provided for your protection. The level of seriousness to be applied to each is explained below:

⚠ WARNING

This statement appears where the information **must** be followed **exactly** to avoid **serious personal injury** or **loss of life**.

⚠ CAUTION

This statement appears where the information **must** be followed to avoid **minor personal injury** or **damage to this equipment**.

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TECHNICAL SPECIFICATIONS - Tandem MIG Torch (800 amp)

Tandem MIG Torch Cable Length Availability

Product number	Torch Cable length	Shipping weight
S22693-121	10 ft cable assembly	28.6 lbs.
S22693-122	8 ft cable assembly	25.2 lbs.
S22693-123	6 ft cable assembly	21.8 lbs.
S22693-124	4 ft cable assembly	18.4 lbs.
S22693-133	12 ft cable assembly	32.0 lbs.

Shielding Gas Flow Rate

Minimum 35 scfh / electrode (70 scfh total) Maximum 70 scfh / electrode (140 scfh total)

Water Cooling

Flow rate: Minimum 0.45 gal/min Flow pressure: Minimum 40 psi

Lead Electrode size

0.035" to 0.062" diameter

Trail Electrode size

0.035" to 0.062" diameter

Duty Cycle

350 amps at 100% per electrode / 700 amps total
400 amps at 60% per electrode / 800 amps total

Maximum current draw per electrode 500 amps

Torch and Cable assembly weights

Torch body: 6.8 lbs (cables elevated 1 ft above torch body, 4ft from torch body)

GENERAL DESCRIPTION

The Tandem MIG 800 Amp Welding Torch is designed to deliver two wire electrodes to a single weld pool. The wire electrodes are electrically isolated from one another providing independent parameter control of both electrodes. The torch has two separate wire spacing options. The torch is designed primarily for robotic applications utilizing wire electrodes in the diameters of .035 through .062 inches. Torch ratings are based on the use of shielding gas mixtures containing a minimum of 82% argon gas.

The torch is designed for easy maintenance.
The aluminum construction of the gooseneck outer jacket and mounting /clamping assemblies defines the lightweight low profile of the torch. The long gooseneck design is provided for ease of robot programming for access to restricted welding joints.
A single water-cooling source to circulate water through the nozzle assembly establishes torch cooling. The aluminum mounting and clamping assembly serves as an added cooling feature providing a heat sink to draw heat from the contact tip area and goosenecks.

The torch may be operated as either a Tandem configuration with two wire electrodes, or as a single wire torch for special applications. Because of the size of the Tandem MIG nozzle, during single wire operation gas delivery through both diffusers is required.

TORCH MOUNTING

The torch mounting arm is an integral part of the torch mounting and clamping assembly, and should not be removed or altered. The mounting arm is designed to place the welding arc at the center line of a robot mounting plate for programming ease. The arm is furnished with a .647" hole for inserting a S22637 torch mounting locking wedge. The mounting wedge is designed to secure the torch to a common .75 " diameter torch collision sensor shaft.

Due to the weight of the torch and rapid movement of many robotic applications it is recommended that a rigid mount be used to secure the torch to a robot arm. The rigid mount S22693-172 is to be used in conjunction with robot collision sensing software.

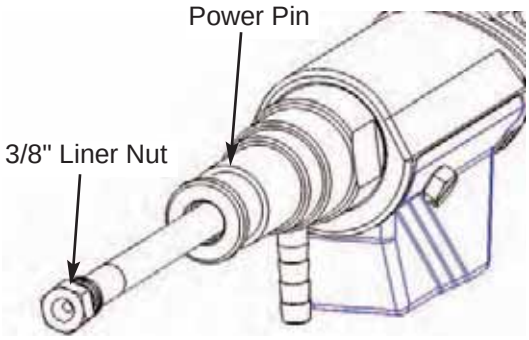
NOTE: The S22693-172 rigid mount is a dummy collision sensor. It is not designed to sense a torch collision. For proper operator and equipment protection the S22693-172 rigid mount should only be used in conjunction with robotic arm collision sensing software.

For hard automation applications and for use with robots that do not have collision sensing software, a heavy-duty collision sensor is recommended (M17809).

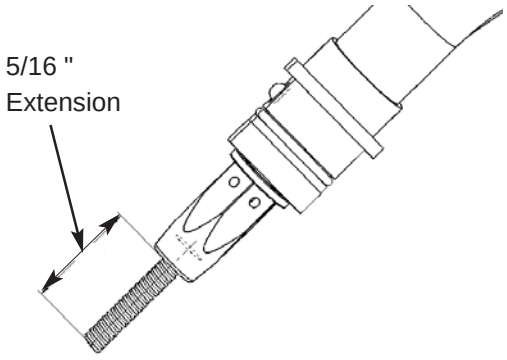
The collision sensor must be of proper rating to withstand the high inertia stopping and starting associated with robot high-speed motion without tripping the sensor.

LINER INSTALLATION

1. Lay the torch and cable on a flat surface and extend cables straight.
2. Remove contact tip and diffuser.
3. With cables straightened, loosen 3/8" liner nut from power pin. Grip liner with pliers and slowly remove.



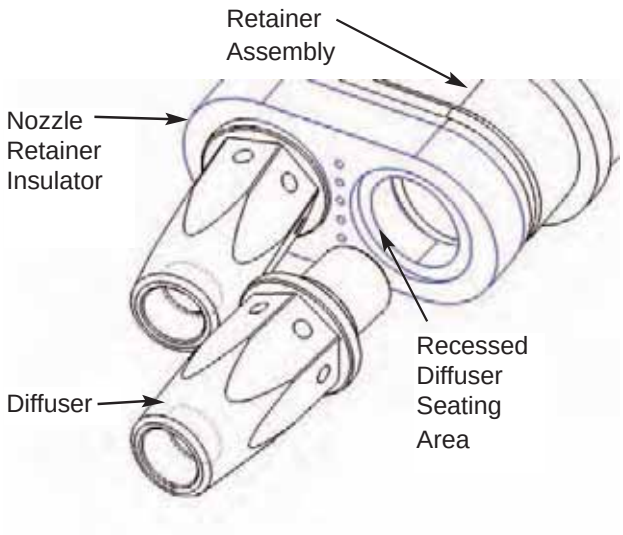
4. With dry compressed air blow cable cavity free of any accumulated dust or filings.
5. Feed replacement liner through cable assembly using short strokes to avoid kinking. Twist liner clockwise if necessary.
6. Seat liner retainer O-ring to inside shoulder bore of power pin by tightening the 3/8" liner nut.
7. Replace diffusers, tighten securely.
8. With liner extending through torch body (contact tip removed), trim liner to a 5/16" length.



9. Remove any burr from end of liner that may obstruct wire feeding.
10. Replace contact tip and gas nozzle.

CONTACT TIP AND DIFFUSER INSTALLATION

The welding torch is equipped with specially designed diffusers. The diffuser is of a low profile design to accommodate the Tandem torch design. The diffuser is required to provide a current path to the contact tip and must be secured tightly. The diffuser also serves as a means to seat and secure the Nozzle Retainer Insulator. Be sure that the Nozzle Retainer Insulator is in good condition before replacing the diffusers. Once it is determined that the insulator is in good condition, place the insulator against the Retainer Assembly with the recessed diffuser seating area facing away from the Retainer Assembly.



Center insulator on gooseneck end and begin threading diffuser (clockwise) in place, tighten securely. The contact tip must be firmly tightened to insure proper current conduction and electrode extension distance.

TORCH CONNECTION TO WIRE FEEDER

The Tandem MIG torch is furnished with a power pin connection designed for direct installation to Lincoln wire feeders: series Synergic 7 and Power Feed 10 Robotic Wire Feeder. (Power Feed 10 Robotic Wire Feeders require installing a K1500-1 gun connector prior to mounting torch.)

Seat the power pin of the welding torch into the power block of the feeder until tight against power pin shoulder. Secure in place with the locking screw provided with the wire feeder. Welding current of the lead wire feeder and the trail wire feeder is isolated through the length of the torch.

Shielding gas delivery must be provided for both the lead and trail wire electrodes. Gas is delivered to the diffuser area through the unicable conductor cable attached to each wire feeder. A 10-inch gas hose assembly with 5/8-18 barred inert gas fitting is provided with the wire feeder. The fitting is to be threaded into the wire feeder female gas outlet fitting. The gas hose should be slid on to the barbed nipple on the torch power pin. Using clamp provided, clamp hose to barbed torch power pin fitting Slide, second clamp over loose end of hose. Slide the loose end of hose over the barbed pin at wire feeder gas outlet. Clamp hose to barbed pin.

CONTACT TIP SELECTION

The torch is configured to accept two different diffuser and contact tip designs, a taper lock contact tip and diffuser and a conventional full threaded contact tip and diffuser design. As standard, the Tandem MIG 800 Amp Welding Torch is supplied with taper lock diffusers.

Taper Lock System

The taper lock system features a contact tip and diffuser design that allows for more surface contact between the contact tip and the diffuser. The added contact surface provided by the tapering of the seating areas of the contact tip and diffuser provides an enlarged current carrying path. The taper system is designed to provide cooler operation and longer contact tip service life.

Contact tips have a dual thread starting point at 180 degrees from one another. The dual thread starting points encourages quick installation and the ability to rotate the contact tip 180 degrees for a longer life cycle.

CONTACT TIP SIZE

Contact tips are available in standard sizes to match the wire specifications of the welding torch (.035, .045, .052 and .062 inches). Some Tandem applications may require greater arc stability than others. If arc instability due to electrical transfer through the contact tip is encountered, an undersized contact tip may be required. For .035" dia. wire use a .030" contact tip and for .045" dia. use a .040" contact tip.

WIRE STRAIGHTENERS

Torch goosenecks' have a 22-degree bend for joint accessibility. The bend provides a wire cast conditioning that forces the welding wire against the contact tip for positive electrical contact. If selected wire packaging counters the effect of the bent goosenecks a wire straightener (K1733-1) placed at the wire feeder may be required to re-establish a useable cast to the wire.

ELECTRODES AND EQUIPMENT

The Tandem MIG 800 amp torch has been designed for use with 0.035" through 0.062" diameter Lincoln Electric solid and metal cored steel GMAW wire welding electrodes. Refer to the appropriate Lincoln process and electrode selection guidelines for further information on available electrodes and packaging.

MAKING A WELD

Observe all safety guidelines, read equipment operating manuals thoroughly before operating equipment.

1. Check to make sure the welding power sources are turned on and set to the correct parameters and welding modes.

2. Verify that the shielding gas supply is on and set for the correct flow rate.

3. Set the preflow and the post flow timers for both wire feeders. Make sure the post flow is set long enough to shield electrode extension as it cools after burn back cycle.

4. Check to see that the water cooler is operating properly. Check cooling fluid level and integrity of cooling hoses.

5. Check all current carrying connections. All connections should be tight: electrode cables, work cables, torch to feeder connections, diffusers and contact tips.

6. If applicable, make sure the air blast is connected and operational.

7. Check to see that the return earth ground is connected and all part clamping is activated.

8. Check torch alignment and ensure that torch or part travel path is free from obstruction.

AVOIDING WIRE FEEDING PROBLEMS

Wire feeding problems can be avoided by observing the following procedures:

1. Do not use a torch with cables that are longer than necessary.

2. Do not kink or pull the torch cables around sharp corners.

3. Keep torches cables as straight as possible or provide a gradual bend in the cables when welding or loading new wire.
4. Protect cables from rubbing against sharp surfaces during operation.

5. Use only clean, rust free electrodes. Protect electrode packaging from collecting airborne contaminates.

6. Replace contact tips and liners at regular intervals.

SHIELDING GAS DELIVERY

Adjust flow regulators for prescribed gas flow. Inspect hoses regularly for wear or damage. Perform a soapy water test on hoses if a leak is suspected. Avoid kinking or collapsing hoses with cable clamps. Insure that diffusers and hose connections are properly seated and tight. Always use an separate flow regulator for each of the two gas lines.

AIR BLAST CLEANING

The welding torch is equipped with a separate gas hose for the purpose of providing a high pressure air blast through the nozzle area to clear loose spatter that may have accumulated between the two diffusers.

The high pressure air is routed through the torch retainer and exits into the nozzle through a series of holes spaced in the retainer insulator.

Air should be dry and free of oil or anti-spatter compound. Pressure should be adequate to free loose spatter (50-100 psi).

NOTE: Do not deliver anti-spatter compound or cleaning fluids through the air blast hose. Fluids applied through the air blast hose will shorten the life of the retainer and insulator and adversely affect welding performance.

NOZZLE REAMING STATIONS

During robotic applications a reamer should be employed to keep the nozzle clean. Reaming the nozzle between welds will reduce the down time associated with manual torch cleaning. The M18426-1 reaming station is an option that is recommended for nozzle cleaning.

ANTI-SPATTER SPRAY

Anti-spatter compound may be used to keep weld spatter from accumulating in the nozzle. Anti-spatter should not be applied through the air blast line. Only dry air should be used for air blast functions.

Anti-spatter may be applied to the interior of the nozzle from an external sprayer. The M18426-1 reaming station comes equipped with an external spraying station for this purpose. Care should be taken to apply the right amount of anti-spatter to the internal area of the nozzle. Too much anti-spatter will cause diffuser clogging and weld porosity. Only a very light covering of anti-spatter is required to keep the spatter from clinging to the nozzle.

CONTACT TIP REPLACEMENT

Each application will dictate the frequency of contact tip replacement. Higher amperage, higher duty cycle operations will require more frequent contact tip replacement. The condition of the contact tip greatly effects the welding performance of the Tandem MIG process. A routine contact tip replacement schedule should be established and adhered to. For general operations contact tips should be changed at the beginning of every shift.

LINER REPLACEMENT

Wire condition, plant environment and the wire consumption rate will dictate how often a liner should be changed. Welding operations using small diameter welding wire will require a more frequent contact tip change interval than operations using larger diameter welding wires. For general operations using .045 " dia wire, liners should be changed or cleaned after approximately 2000 lbs. of wire use.

GOOSENECK REPLACEMENT

The Tandem torch is designed with two separate goosenecks that extend from the mounting and clamping arm assembly. The goosenecks are configured as a left and a right gooseneck, they are not interchangeable. Goosenecks require replacement when they become bent or the outer cover becomes damaged.

Replacement Procedure

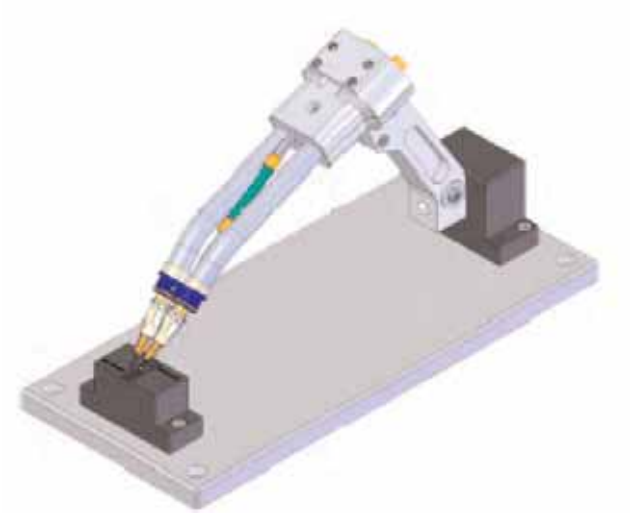
1. Disconnect the water supply and return hoses as well as the air blast hose.
2. Remove the five hex head screws (5/32" allen) securing the upper housing of the torch clamping assembly.
3. Remove torch diffusers, nozzle insulator and retainer.
4. Lift upper portion of clamping assembly from lower, slide back the black plastic back housing to expose gooseneck to unicable connection.
5. Free the connection form the clamping assembly and with one 1" and one 3/4"" wrench unscrew gooseneck from unicable brass junction fitting.
6. Replace damaged gooseneck with replacement gooseneck making sure that the gooseneck is properly identified as either a left or right gooseneck. (Left and right are determined by viewing the torch from the nozzle end.)
7. Place newly assembled unicable and gooseneck back into the back plastic housing.
8. Place nylon spacer between the two flat surfaces of the gooseneck brass connector. (Flat surfaces should be aligned parallel to each other.)
9. Seat back hosing inside the recessed lip of the lower portion of clamping assembly.
10. Install upper half of clamping assembly after seating goosenecks and plastic housing.
11. Loosely tighten the five hex head screws of clamping house.
12. Install gooseneck insulators onto both goosenecks.
13. Slide nozzle retainer over goosenecks and gooseneck insulators. (Necks should be free to rotate as the new retainer is slid into place.)
14. Install nozzle insulator over ends of goosenecks.
15. Install gas diffusers.
16. Install contact tips.
17. Check contact tip alignment. Alignment should be at equal angles and square to the body of the torch. (use L10430-1 alignment tool).
18. Once contact tips are aligned, securely tighten the five hex head screws of clamping assembly.
19. Recheck alignment after tightening the clamping assembly.
20. Reinstall gas and water hoses.

CONTACT TIP ALIGNMENT

During gooseneck replacement or after a torch collision it may be required to check the contact tip alignment. If using a robot, it is recommended that a tool center pointer is placed in the robotic cell to define the location of the lead wire. A second locating station should be installed that provides two locating pins that will check the alignment of the lead and trail wire.

If the torch requires maintenance that will effect the alignment of the lead or trail wire placement, the torch should be removed from the robot or hard automation work cell and the L10430-1 torch alignment tool should be used to realign wire placement.

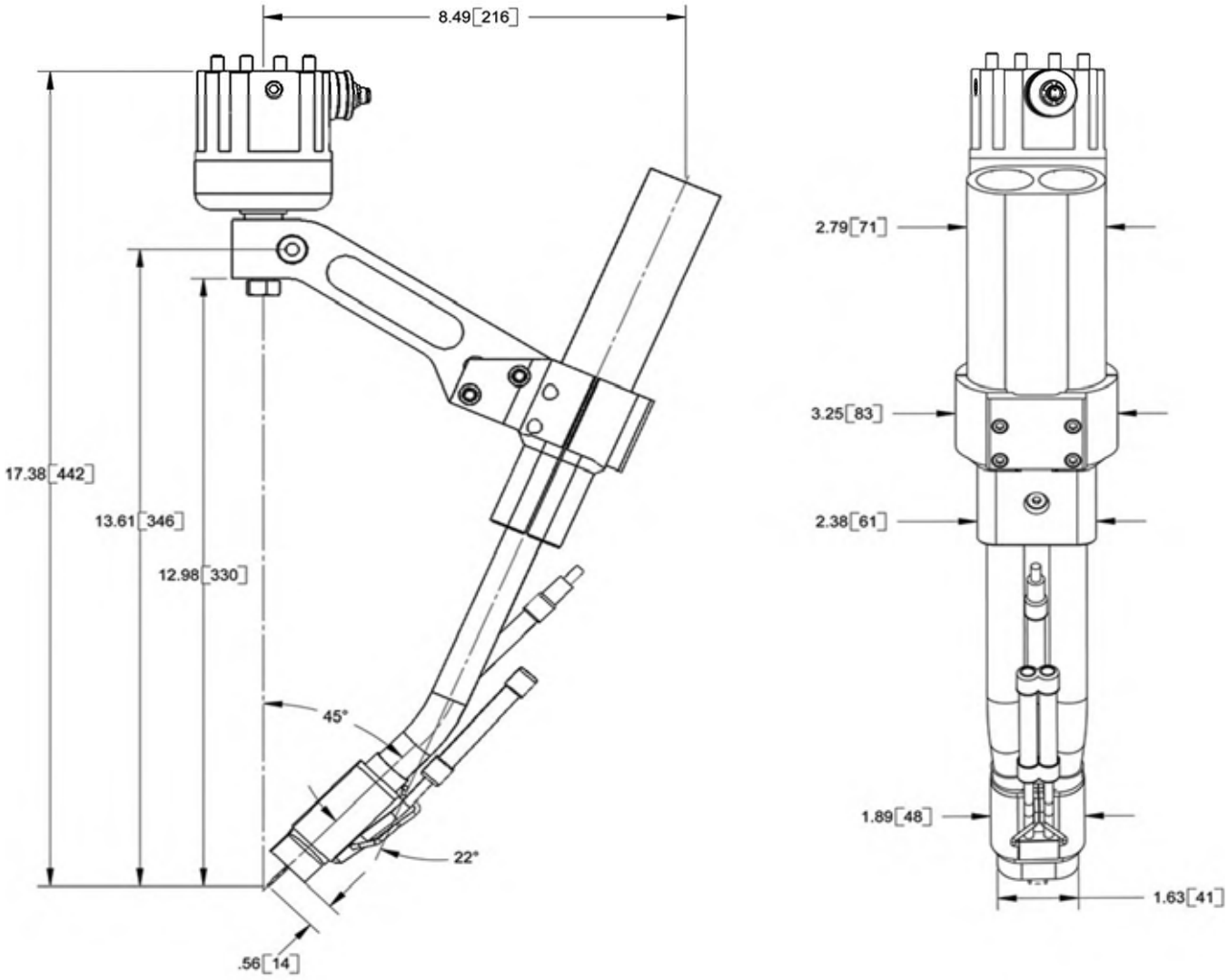
L10430-1 Torch Alignment Tool



Alignment Procedure

1. Remove torch from automated equipment.
2. Remove torch nozzle assembly.
3. Select desired contact tip spacing by pivoting front alignment block of alignment fixture to correct spacing. (Two wire spacings are provided 5/16" standard and a 3/8" wide.)
4. With retainer, diffusers and contact tips in place insert a straight portion of welding wire into each contact tip to simulate a 5/8" wire extension past the contact tip.
5. Secure mounting bracket assembly of torch to back mounting block of alignment fixture by securing torch mounting arm to the keyed .750" mounting dowel provided.
6. Loosen the 5 hex head screws of mounting bracket that hold goosenecks in place.
7. Pivot goosenecks to align the two 5/8" extended wires to the indictor marks on the front block of alignment gauge.
8. Secure goosenecks in place by tightening the five hex head screws.
9. Recheck wire alignment.
10. Remove torch from alignment fixture.

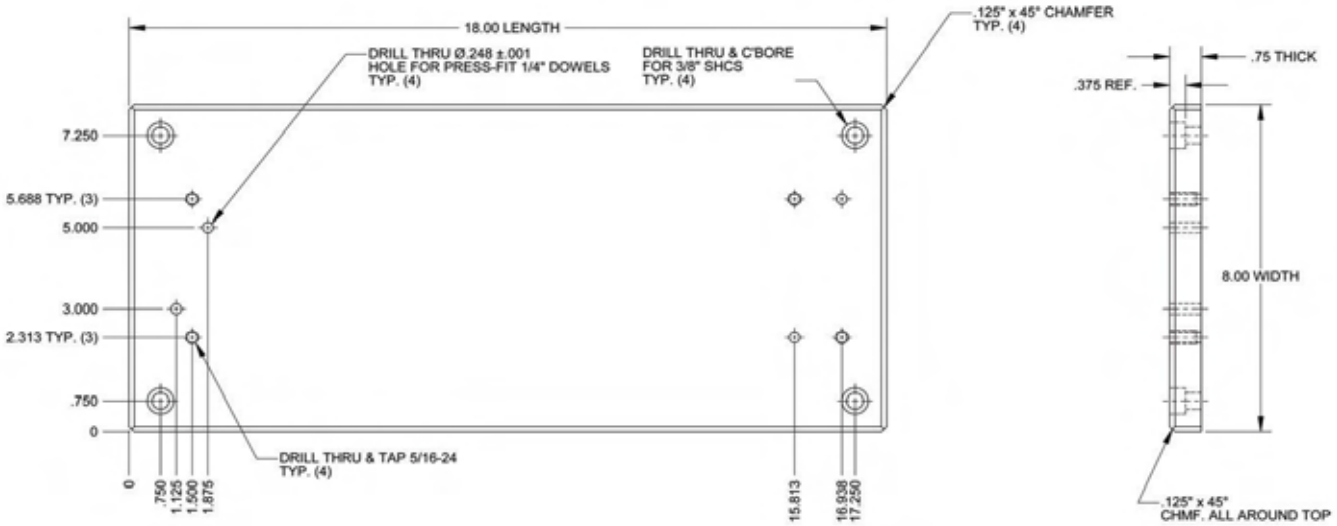
S22693-XXX MIG 800 amp Torch



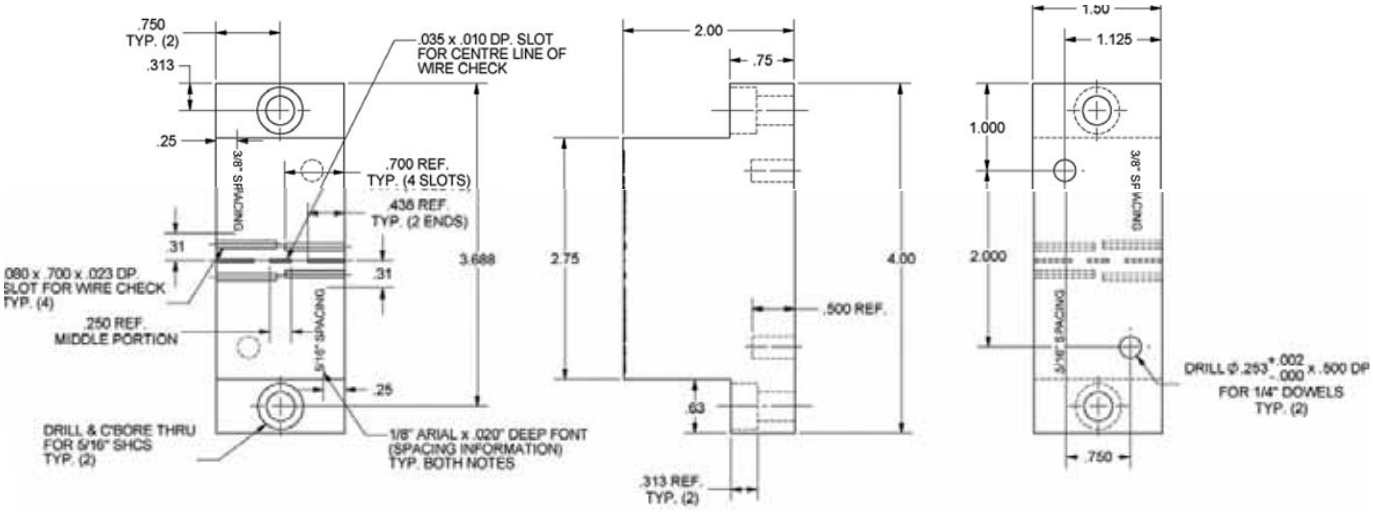
All dimensions in inches. Bracketed dimensions are in [millimeters]

L10430-1 Torch Alignment Tool
(Consisting of the following three parts)

1. Base dimensions (Part number L10430-3)

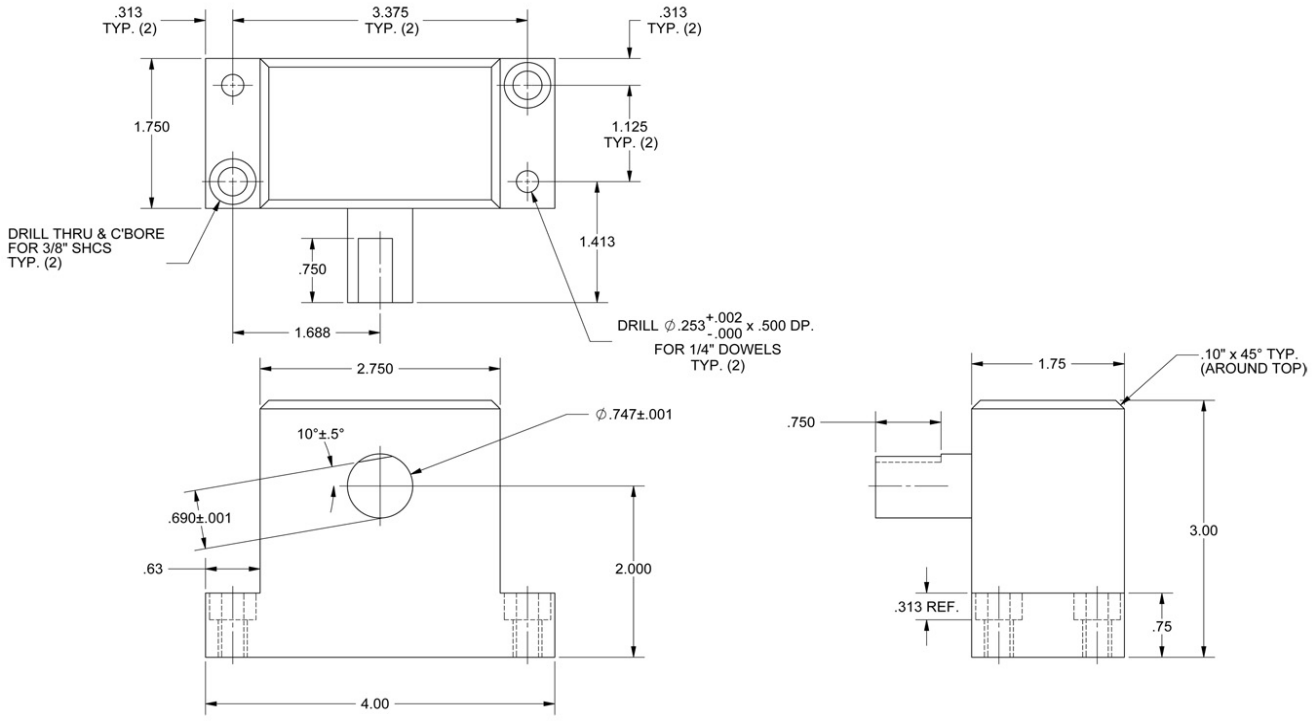


2. Check Block dimensions (Part number L10430-2)



L10430-1 Torch Alignment Tool

3. Holding block dimensions (Part number L10430-4)



HOW TO USE TROUBLESHOOTING GUIDE

⚠ WARNING

Service and Repair should only be performed by Lincoln Electric Factory Trained Personnel. Unauthorized repairs performed on this equipment may result in danger to the technician and machine operator and will invalidate your factory warranty. For your safety and to avoid Electrical Shock, please observe all safety notes and precautions detailed throughout this manual.

This Troubleshooting Guide is provided to help you locate and repair possible machine malfunctions. Simply follow the three-step procedure listed below.

Step 1. LOCATE PROBLEM (SYMPTOM).
Look under the column labeled “PROBLEM (SYMPTOMS)”. This column describes possible symptoms that the machine may exhibit. Find the listing that best describes the symptom that the machine is exhibiting.

Step 2. POSSIBLE CAUSE.
The second column labeled “POSSIBLE CAUSE” lists the obvious external possibilities that may contribute to the machine symptom.

Step 3. RECOMMENDED COURSE OF ACTION
This column provides a course of action for the Possible Cause, generally it states to contact your local Lincoln Authorized Field Service Facility.

If you do not understand or are unable to perform the Recommended Course of Action safely, contact your local Lincoln Authorized Field Service Facility.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

TROUBLESHOOTING

D-2

Observe all Safety Guidelines detailed throughout this manual

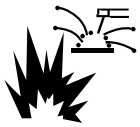
PROBLEMS (SYMPTOMS)	POSSIBLE CAUSE	RECOMMENDED COURSE OF ACTION
The drive rolls turn, but wire will not feed or wire feeding is rough.	1. Torch cable is kinked and /or twisted.	1. Keep cable assembly as straight as possible. Inspect cable and replace if necessary.
	2. Wire jammed in torch or cable.	2. Check for any obstructions in cable assembly. Check liner, replace if necessary.
	3. Incorrect or worn drive rolls and guide tubes.	3. Be sure the wire diameter being used matches the drive rolls and guide tubes size.
	4. Partially flashed, melted or improper contact tip size.	4. Replace contact tip.
Porosity in the weld.	1. Welding surface is contaminated.	1. Remove dirt, oil, moisture, mill scale and miscellaneous contamination from part.
	2. Insufficient gas coverage.	2. Check for sufficient shielding gas flow form source, or restriction in gas line. Check for drafts that may force shielding gas from welding arc.
	3. Excessive arc length.	3. Check weld procedures, arc length should generally be less than 1/4" and steady.
	4. Inoperative gas solenoid.	4. Check solenoid operation.
	5. Contaminated shielding gas.	5. Check for leaks in gas hoses and gas hose connections.
	6. Excessive use of anti-spatter fluid.	6. Check amount of anti-spatter being applied and accumulation in nozzle.
There is arcing in the nozzle.	1. Spatter build-up is bridging between the nozzle and the contact tips, or from contact tip to contact tip.	1. Remove spatter build-up on regular basis. Adjust weld procedure to reduce spatter.
	2. The torch is not insulated from part tooling or fixture.	2. Make sure torch is properly insulated.
The welding arc is inconsistent.	1. Worn or loose contact tip.	1. Inspect contact tip, tighten and replace if necessary.
	2. Loose connection in current path.	2. Check electrode and work cable connections. Check torch connections at wire feeder, diffuser and goosenecks.
	3. The wire conduit or liner is dirty or worn.	3. Clean liner and conduit. Replace if necessary.
Inconsistent wire feeding.	1. Loose, worn or incorrect drive rolls.	1. Inspect drive rolls, tighten, clean or replace as necessary.
	2. Torch cable kinked or liner worn.	2. Check cable for severe bends or kinking. Check, and clean liner as neccesary.
	3. Wire pay-off dispenser malfunctioning.	3. Check dispenser, make sure moving parts are free from obstruction and welding wire is properly routed.

⚠ CAUTION

If for any reason you do not understand the test procedures or are unable to perform the tests/repairs safely, contact your **Local Lincoln Authorized Field Service Facility** for technical troubleshooting assistance before you proceed.

NOTES

NOTES

			
WARNING	● Do not touch electrically live parts or electrode with skin or wet clothing. ● Insulate yourself from work and ground.	● Keep flammable materials away.	● Wear eye, ear and body protection.
Spanish **AVISO DE PRECAUCION**	● No toque las partes o los electrodos bajo carga con la piel o ropa mojada. ● Aislese del trabajo y de la tierra.	● Mantenga el material combustible fuera del área de trabajo.	● Protéjase los ojos, los oídos y el cuerpo.
French **ATTENTION**	● Ne laissez ni la peau ni des vêtements mouillés entrer en contact avec des pièces sous tension. ● Isolez-vous du travail et de la terre.	● Gardez à l'écart de tout matériel inflammable.	● Protégez vos yeux, vos oreilles et votre corps.
German **WARNUNG**	● Berühren Sie keine stromführenden Teile oder Elektroden mit Ihrem Körper oder feuchter Kleidung! ● Isolieren Sie sich von den Elektroden und dem Erdboden!	● Entfernen Sie brennbarres Material!	● Tragen Sie Augen-, Ohren- und Körperschutz!
Portuguese **ATENÇÃO**	● Não toque partes elétricas e electrodos com a pele ou roupa molhada. ● Isole-se da peça e terra.	● Mantenha inflamáveis bem guardados.	● Use proteção para a vista, ouvido e corpo.
Japanese **注意事項**	● 通電中の電気部品、又は溶材にヒフやぬれた布で触れないこと。 ● 施工物やアースから身体が絶縁されている様にして下さい。	● 燃えやすいものの側での溶接作業は絶対にしてはなりません。	● 目、耳及び身体に保護具をして下さい。
Chinese **警 告**	● 皮肤或濕衣物切勿接觸帶電部件及銲條。 ● 使你自己與地面和工件絕緣。	● 把一切易燃物品移離工作場所。	● 佩戴眼、耳及身體勞動保護用具。
Korean **위 험**	● 전도체나 용접봉을 젖은 헝겁 또는 피부로 절대 접촉치 마십시요. ● 모재와 접지를 접촉치 마십시요.	● 인화성 물질을 접근 시키지 마시요.	● 눈, 귀와 몸에 보호장구를 착용하십시요.
Arabic **تحذير**	● لا تلمس الاجزاء التي يسري فيها التيار الكهربائي أو الالكترود بجلد الجسم أو بالملابس المبللة بالماء. ● ضع عازلا على جسمك خلال العمل.	● ضع المواد القابلة للاشتعال في مكان بعيد.	● ضع أدوات وملابس واقية على عينيك وأذنيك وجسمك.

READ AND UNDERSTAND THE MANUFACTURER'S INSTRUCTION FOR THIS EQUIPMENT AND THE CONSUMABLES TO BE USED AND FOLLOW YOUR EMPLOYER'S SAFETY PRACTICES.

SE RECOMIENDA LEER Y ENTENDER LAS INSTRUCCIONES DEL FABRICANTE PARA EL USO DE ESTE EQUIPO Y LOS CONSUMIBLES QUE VA A UTILIZAR, SIGA LAS MEDIDAS DE SEGURIDAD DE SU SUPERVISOR.

LISEZ ET COMPRENEZ LES INSTRUCTIONS DU FABRICANT EN CE QUI REGARDE CET EQUIPMENT ET LES PRODUITS A ETRE EMPLOYES ET SUIVEZ LES PROCEDURES DE SECURITE DE VOTRE EMPLOYEUR.

LESEN SIE UND BEFOLGEN SIE DIE BETRIEBSANLEITUNG DER ANLAGE UND DEN ELEKTRODENEINSATZ DES HERSTELLERS. DIE UNFALLVERHÜTUNGSVORSCHRIFTEN DES ARBEITGEBERS SIND EBENFALLS ZU BEACHTEN.

● Keep your head out of fumes. ● Use ventilation or exhaust to remove fumes from breathing zone.	● Turn power off before servicing.	● Do not operate with panel open or guards off.	**WARNING**
● Los humos fuera de la zona de respiración. ● Mantenga la cabeza fuera de los humos. Utilice ventilación o aspiración para gases.	● Desconectar el cable de alimentación de poder de la máquina antes de iniciar cualquier servicio.	● No operar con panel abierto o guardas quitadas.	Spanish **AVISO DE PRECAUCION**
● Gardez la tête à l'écart des fumées. ● Utilisez un ventilateur ou un aspirateur pour ôter les fumées des zones de travail.	● Débranchez le courant avant l'entretien.	● N'opérez pas avec les panneaux ouverts ou avec les dispositifs de protection enlevés.	French **ATTENTION**
● Vermeiden Sie das Einatmen von Schweibrauch! ● Sorgen Sie für gute Be- und Entlüftung des Arbeitsplatzes!	● Strom vor Wartungsarbeiten abschalten! (Netzstrom völlig öffnen; Maschine anhalten!)	● Anlage nie ohne Schutzgehäuse oder Innenschutzverkleidung in Betrieb setzen!	German **WARNUNG**
● Mantenha seu rosto da fumaça. ● Use ventilação e exhaustão para remover fumo da zona respiratória.	● Não opere com as tampas removidas. ● Desligue a corrente antes de fazer serviço. ● Não toque as partes elétricas nuas.	● Mantenha-se afastado das partes moventes. ● Não opere com os paineis abertos ou guardas removidas.	Portuguese **ATENÇÃO**
● ヒュームから頭を離すようにして下さい。 ● 換気や排煙に十分留意して下さい。	● メンテナンス・サービスに取りかかる際には、まず電源スイッチを必ず切って下さい。	● パネルやカバーを取り外したままで機械操作をしないで下さい。	Japanese **注意事項**
●頭部遠離煙霧。 ●在呼吸區使用通風或排風器除煙。	●維修前切斷電源。	●儀表板打開或沒有安全罩時不準作業。	Chinese **警 告**
● 얼굴로부터 용접가스를 멀리하십시요. ● 호흡지역으로부터 용접가스를 제거하기 위해 가스제거기나 통풍기를 사용하십시요.	● 보수전에 전원을 차단하십시요.	● 판넬이 열린 상태로 작동치 마십시요.	Korean **위 험**
● ابعد رأسك بعيداً عن الدخان. ● استعمل التهوية أو جهاز ضغط الدخان للخارج لكي تبعد الدخان عن المنطقة التي تتنفس فيها.	● اقطع التيار الكهربائي قبل القيام بأية صيانة.	● لا تشغل هذا الجهاز اذا كانت الاغطية الحديدية الواقية ليست عليه.	Arabic **تحذير**

LEIA E COMPREENDA AS INSTRUÇÕES DO FABRICANTE PARA ESTE EQUIPAMENTO E AS PARTES DE USO, E SIGA AS PRÁTICAS DE SEGURANÇA DO EMPREGADOR.

使う機械や溶材のメーカーの指示書をよく読み、まず理解して下さい。そして貴社の安全規定に従って下さい。

請詳細閱讀並理解製造廠提供的説明以及應該使用的銀捍材料，並請遵守貴方的有関勞動保護規定。

이 제품에 동봉된 작업지침서를 숙지하시고 귀사의 작업자 안전수칙을 준수하시기 바랍니다.

اقرأ بتمعن وافهم تعليمات المصنع المنتج لهذه المعدات والمواد قبل استعمالها واتبع تعليمات الوقاية لصاحب العمل.

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